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# Experimental data on the effect of pressure on the volatiles partitioning (Cl, F, $H_2O$) in fluid-magmatic systems

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Fluids, separating from the silicate melt with decreasing pressure during magma ascent, will contain all smaller amounts of chlorine and presumably of fluorine due to repartitioning of these halogens into the melt. Effect of pressure on the partitioning of F is expressed more weakly compared with Cl.
Experimental studies on the solubility (1N NaCl +0.1N HCl) chloride acidoulous fluid in model melts of granodioritic, granitic and leucogranitic compositions were carried out at T =900-1000oC and P =500 and 100 MPa (Chevychelov, Chevychelova, 1997). The mass ratio of fluid / melt was (2-3): 1. The chlorine content after the experiments was defined only in granitoid melts (glasses). It is shown that, when the pressure is reduced from 500 to 100 MPa, the chlorine content in the silicate melt increases 3-2.5 times (from 0.3 wt.% to 0.9-0.8 wt.% in granodioritic melt, from 0.2% to 0.6-0.5% in granitic melt and from 0.2% to 0.5-0.4% in the leucogranitic melt). At these conditions the content of $H_2O$ in granitoid melts decreases approximately 2.5 times from 9-11 wt.% to 4 wt.% (Johannes, Holtz, 1996).
Another series of experiments on the solubility of (HCl + HF) fluids of various concentration (from 1N to 16N) in phonolitic melt was held at T =1000°C and P =400, 200 and 50 MPa (Chevychelov, Mukhanova, 2008). The mass ratio of fluid / melt was 0.15:1. The chlorine and fluorine contents in the melt (glass) after the experiments were determined by microprobe analysis. With decreasing pressure the water content in the silicate melts decreased from 8-9 wt.% at 400 MPa to about 6 wt.% at 200 MPa and up to 2-3 wt.% at 50 MPa (Behrens et al., 2009). The Cl, F and $H_2O$ contents in the fluid coexisting with phonolitic melt were calculated using the mass balance method. It is shown that with decreasing pressure the chlorine content in phonolitic melt increases (from 0.1 wt.% to 0.35 wt.% at 1N HCl), and the chlorine content in the fluid decreases (from 8-9 wt.% to 1.5 wt.%). With increasing concentration of fluid the pressure effect on the partitioning of Cl decreases. The pressure has a weaker influence on the partitioning of F compared with Cl. At 3-7N HF fluid with decreasing pressure the fluorine content in the fluid coexisting with phonolitic melt decreases. At 1N HF fluid the pressure effect on the partitioning of F is not identified.